

Application No.: 09/829,943
Reply to Office Action of October 24, 2003.

BASIS FOR THE AMENDMENT

Claims 1-5 and 7-35 are active in the present application. Claims 16-19 and 21-22 are non-elected claims. Claims 1-5, 7-15, 20 and 23-35 are currently under active prosecution. Claim 6 has been canceled. Claim 1 has been amended to limit the hydrophobic filler to hydrophobic fillers having a carbon content of from 0.1 to 5% by weight. Claim 1 has been further amended to limit the hydrophobic filler to precipitated silica, pyrogenic silica, silicates and synthetic pigments. Support for the amendment is found in original Claim 6 and on page 3, lines 16-24. Independent Claim 20 has been amended to limit the hydrophobic filler to those fillers having a carbon content of 0.1 to 5% by weight. Support for the amendment is found in original Claim 6. Claims 23-30 are new claims. Support for new Claims 23 and 24 is found on page 4, lines 7-10. Support for new Claim 25 is found on page 8 lines 2-5. Support for new Claim 26 is found on page 5, lines 12-14. Support for new Claim 27 is found on page 5, lines 15-21. Support for new Claim 28 is found throughout the specification. Support for new Claim 29 is found on page 4, line 31. Support for new Claim 30 is found in the Examples. Support for new Claim 31 is found in U.S. Patent No. 5,686,054 which is incorporated by reference in the present specification on page 4, lines 27-28 (US 5,686,054 is the corresponding US patent to DE 44 19 234). Support for new Claims 32-35 is found on page 3, lines 16-24. No new matter is believed to have been added by this amendment.

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REQUEST FOR RECONSIDERATION

Applicants thank Examiner Wood for the helpful and courteous discussion of November 25, 2003. During the discussion, Applicants' U.S. representative presented arguments that the hydrophobic particles of the prior art references relied upon by the Office are not partially hydrophobic particles.

Applicants have claimed a coating composition which contains at least a partially hydrophobic filler particle and a binder. The coating composition is useful in the manufacture of, for example, inkjet media such as paper, films and textiles (page 1, lines 6-7). The coating composition of the claimed invention is useful and provides advantages in inkjet media such as increased water resistance, improved ink fixing and increased print quality such as color intensity and point sharpness (page 9, lines 22-29).

Applicants attach herewith a partial translation of a document ("Inkjet Printer Gijutsu to Zairyo" (Technology of Inkjet Printer and Materials therefore), K.K. CMC July 31, 1998, First Edition, pp. 53-62) cited by the Japanese Examiner in the corresponding Japanese application. The reference is submitted as evidence that it is known in the art that a hydrophobic coating is not desirable in ink receiving layers. In fact, it is stated in the partial translation "... a far better result can be obtained when using uncoated paper than coated paper. On a dense and hydrophobic coated layer, the ink does not penetrate into the paper and spreads on the surface, causing color changes..." (see the first page of the partial English translation, lines 8-4 from the bottom).

Applicants further submit herewith the chapters titled Silica and Silica (Amorphous) from "Kirk-Othmer Encyclopedia of Chemical Technology, 3rd ed.", Volume 20, Wiley-Interscience, New York (1982), pp. 748-781 (copy attached herewith). The information

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provided in this technical reference is provided as a showing that those of ordinary skill in the art would not use a precipitated silica, a pyrogenic silica or a silicate to prepare a coating for paper (silica gel is disclosed as a component of several of the prior art compositions disclosed in references cited in an Office Action issued in by the Japanese Patent Office in a corresponding foreign application; see further discussion below).

At the outset, amorphous silica is known to exist in forms such as colloidal silica, silica gel, precipitated silica, and fumed or pyrogenic silica (9th paragraph on page 762 of Kirk-Othmer). Silica gel is known to be a coherent, rigid continuous three-dimensional network of spherical particles of colloid silica (see second paragraph on page 774 of Kirk-Othmer). In contrast, precipitated and pyrogenic silica is known to exist in a form that is based on aggregates of colloidal size silica particles that have not become linked in a massive network (1st paragraph on page 776 of Kirk-Othmer). Therefore silica gel and precipitated or fumed silica have different forms. Lacking an inter-networked structure the precipitated and pyrogenic silicas have a more irregular structure. A silica having a less regular form may be expected to exhibit less regular ink absorption and hence poorer image quality with regards to the regularity of ink spots. Although those of ordinary skill in the art may expect a silica gel to provide better performance instead of a precipitated or pyrogenic silica applicants have demonstrated that precipitated or pyrogenic silica can provide coating compositions having good performance ink receiving performance.

In Tables 3 and 4 on page 16-18 of the specification Applicants have demonstrated that coatings containing the hydrophobic silicas of Examples 1-8 are able to provide better performance than a coating composition containing a conventional silica having greater hydrophilic characteristics than the invention coatings (e.g., the “standard recipe”). This

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hydrophilic property is demonstrated for example in Table 1 which shows that the carbon content of the standard recipe is 0.05 and in Table 8 (see last line of row 7) which shows that that standard recipe is not hydrophobic whereas the invention coating has hydrophobic characteristics. In the bottom row of Table 5 on page 19 the total score of each coating composition's ink-receiving performance is scored. The coating containing the conventional silica (e.g., the "standard recipe") has the poorest performance (the highest score indicates the poorest performance).

Applicants have disclosed a coating composition which in one aspect provides excellent ink absorption counter to what may be expected by those of ordinary skill in the art. Applicants have demonstrated that the claimed hydrophobic silica-containing coating is able to provide superior ink-receiving properties than a coating which contains a conventional hydrophilic silica.

The Office rejected original Claims 1-15 and 21 in view of patents to Nedelec (U.S. 5,387,364); and L'Hostis (U.S. 5,486,306) under 35 U.S.C. §103(a). Applicants traverse the rejection in view of L'Hostis and Nedelec on the grounds that the prior art references cited by the Office are drawn to foam controlling agents and a method for controlling foam. The foam control agent of L'Hostis contains an organopolysiloxane in amounts of 70-99.9 parts by weight (see Abstract and Claim 1). Likewise, the foam control agent of Nedelec comprises from 5-90 parts by weight of an organopolysiloxane (see Abstract) and additionally 5-90 parts by weight of a hydrocarbon oil (see Claim 1). As is evident in Table 1 in column 8 of Nedelec, the prior art compositions contain large amounts of polyorganosiloxane and hydrocarbon oil and a relatively small amount of filler (approximately 100 parts by weight of polysiloxane and hydrocarbon oil together with

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approximately 5 parts by weight of the filler). The foam controlling agents of L'Hostis and Nedelec have an excess of oil or organopolysiloxane.

Applicants submit that the presently claimed coating composition wherein the carbon content is limited to from 0.1 to 5% is not obvious in view of the prior art foam control agents which necessarily have an excess of oil or organopolysiloxanes. A coating composition containing an excess of oil makes no sense in view of the fact that the oil would rise to the surface thereby detrimentally affecting the appearance and purity of the coating.

Moreover, although the hydrophobic filler present in the claimed coating composition is derived from a filler particle such as silica and a silicon-containing material such as silicone oil, the claimed hydrophobic filler does not contain the silicon oil in a fashion which would permit its release i.e., traces of silicon oil may be released from the filler by, for example, strong mechanical abrasion. As is known in the art, as evidenced by the disclosures of U.S. Patent Nos. 5,686,054; 5,851,715; 4,208,316; 4,273,589; and 3,830,738 (e.g., the U.S. corresponding applications to DE4419234A1; DE-C2729244; DE2628975C2; and DE-OS2107082; incorporated by reference in their entirety in the present specification on page 4, last paragraph), the hydrophobic filler is chemically bound to the hydrophobizing agent (e.g., silicon oil) and thereby prevents its disassociation or release from the filler particle (copies of the afore-mentioned U.S. patents are submitted on a PTO-1449 for the Examiner's convenience). In contrast, all of the prior art compositions cited by the Examiner contain an amount of hydrocarbon oil or a polyorganosiloxane that is mixed with a previously hydrophobized particle and is therefore not necessarily bound to the surface of the particle and consequently can be released. The prior art compositions are not suitable as coating

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compositions since they would release oil and thereby smudge surfaces and impart poor coating and appearance characteristics.

Applicants submit the claimed coating composition is not obvious in view of the prior art foaming agents on the basis that the foaming agents are disclosed to contain an excess of hydrocarbon oils or organopolysiloxanes which would necessarily negatively impact the performance of the claimed composition as a coating agent. A composition containing an excess of hydrocarbon oil or silicon oil is not suitable as a composition for coating substrates such as for example paper for use as inkjet media.

New Claim 31 limits the hydrophobic filler to those fillers that comprise a silicone surface treating agent chemically fixed to the filler.

New dependent Claim 30 further limits the claimed invention to those coating compositions which consist essentially of the hydrophobic filler, water, and a binder. The transitional phrase “consisting essentially of” is used to describe compositions which contain at least the components explicitly disclosed in the claim and may further contain additional components so long as the additional components do not materially affect the basic or novel characteristics of the claimed invention. As stated in *In re Janakirama-Rao*, 137 USPQ 393 (CCPA, 1963), “[T]he word “essentially” opens the claims to the inclusion of ingredients which would *not* materially affect the *basic novel characteristics . . .*” (emphasis in the original; see also MPEP §2111.03, Transitional Phrases).

The Office further rejected Claims 1-15 and 20 as obvious in view of a patent to Bertry (U.S. 5,998,536). Bertry describes an emulsion composition used for coating textiles (see Title). The emulsion is a protective hydrocolloid solution obtained by direct emulsification of an organopolysiloxane (see Abstract). Bertry claims a composition which

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has a silicone phase (see Claim 1). As was mentioned for Nedelec and L'Hostis above, Bertry requires the presence of excess polydiorganosiloxane. The presence of excess amounts of material is not suitable for a coating composition such as that presently claimed. A coating composition containing an excess of this material will necessarily leave residues of oil as the composition dries. Such oil residues obviously are not acceptable on a paper substrate that is intended for inkjet printing.

Applicants submit that the composition as claimed in Claim 1, wherein the hydrophobic filler is one wherein the hydrophobizing agent is bound to the filler in such a manner as to prevent the release of a silicon-containing material from the composition is not obvious in view of Bertry.

New dependent Claim 30 is further patentable in view of Bertry since it excludes those components from the composition that may affect the composition's basic and novel characteristics. Applicants submit that the presence of excess silicone or hydrocarbon oil would negatively effect the basic and novel characteristics of the claimed invention since these materials would migrate to the surface of a paper coated with a composition, and inhibit the ability of an ink to be deposited on the paper to provide an inkjet image.

New dependent Claim 29 limits the filler to partially hydrophobic fillers. Partially hydrophobic filler particles that adhere to this claim limitation may be obtained, for example, by mixing silica particles with a silicone oil in a homogeneous manner. The mixing of the two components may be carried out in a ratio so that the silica particles are present in a greater quantity than the silicon oil and hence are not rendered fully hydrophobic.

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Nedelec nowhere discloses filler particles that have been rendered partially hydrophobic. In column 5, lines 17-40 finely divided hydrophobic particulate material is described. The particulate material may include silica (column 5, line 19). It is disclosed:

These silica particles can be rendered hydrophobic e.g. by treating them with dialkylsilyl groups and/or trialkylsilyl groups either bonded directly onto the silica or by means of a silicon resin. We prefer to employ a silica the particles of which have been rendered hydrophobic with dimethyl and/or trimethylsilyl groups. (column 5, lines 28-8).

As is noted in the passage above, the particulate material of Nedelec is “rendered hydrophobic”. There is no disclosure which would indicate that the prior art particles are rendered partially hydrophobic.

The hydrophobic silica of Nedelec is further described in column 8, lines 13-Table I. It is disclosed that a fumed silica is treated with hexamethyldisilazane and mineral oil. Table I in column 8 provides the ratios of the weight percents of the polyorganosiloxane, filler and hydrocarbon. As is evident from Table I in each case the polyorganosiloxane is present in at least equal weight percentage amounts relative to the filler. In most cases the polyorganosiloxane is present in substantially greater quantities than the filler. Applicants submit that this disclosure in Table I demonstrates that Nedelec does not contemplate limiting the amount of polyorganosiloxane mixed with the filler and therefore does not disclose or suggest a partially hydrophobic filler.

L’Hostis discloses a finely divided hydrophobic particulate material at column 4, lines 27-49.¹ L’Hostis further describes the preparation of the prior art hydrophobic material at column 5, lines 11-15. There it is disclosed that “making the particulate material hydrophobic may be done *in situ*”. In Table II in column 8 of L’Hostis foam control agents

¹ The relevant disclosure in column 4 of L’Hostis describing the hydrophobic silica particles is the same as that disclosed in column 5 of Nedelec.

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AF27-AF31 are described. In these compositions the amount of polyorganosiloxane is less than the amount of particulate material (for example from 1 to 6 wt.% of the polyorganosiloxane to 10 wt.% of the particulate material). However the particulate material was previously treated with polydimethylsiloxane (column 7, lines 57-58). Therefore, neither of Nedelec or L'Hostis disclose or suggest compositions which contain partially hydrophobic filler particles. The presently claimed invention is therefore novel and not obvious in view of L'Hostis and/or Nedelec.

Bertry discloses silicas at column 7, lines 14-28. It is disclosed that the silicas can be incorporated "as such" and can then be "optionally treated with one or more organosilicon compounds". The preferred formulae of the Bertry invention are disclosed at column 9, line 57 through column 10, line 25. The prior art colloidal silica is disclosed to be a dispersion in a "divinylated silicon oil" (column 9, lines 59-60). In the Examples of Bertry (as cited by the Office in the Office Action) the silica is described as a "dispersion of hydrophobic colloidal silica in silicon oil" (column 11, lines 49-50; column 11, lines 62-63; column 13, lines 2-3). Nowhere in Bertry is it disclosed or suggested that the prior art particulate material (silica) may be partially hydrophobic.

Applicants therefore submit that the disclosure of Bertry does not render obvious the subject matter of new Claim 29.

Applicants submit that it is recognized in the art that inks used in inkjet printing may contain both ionic and nonionic functionalities. Since some inks are ionic in nature they tend to fix better and run less if they are absorbed or applied upon a surface which is coated with a substance that can adhere to the ionic portion of the ink. On the other hand, since some inks have a hydrophobic portion (e.g., an aliphatic portion) it is possible they will interact and fix

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better upon a hydrophobic substrate having less ionic character. Perhaps the partially hydrophobic characteristics of the filler particle of the present claims allows interaction of both the hydrophobic and ionic functionalities of ink materials thereby allowing improved printing quality. It is possible that at least a portion of this improvement is due to the partially hydrophobic nature of the filler particle.

In the Office Action of October 24, 2003, the Office did not acknowledge priority under 35 U.S.C. § 119. Applicants submitted a Request for Priority upon filing of the present application on April 11, 2001. A copy of the priority document was submitted to the Office on July 23, 2001. Copies of date-stamped filing receipts evidencing the timely submission of the Request for Priority and the Priority Document are attached herewith. Applicants request the Examiner acknowledge priority under 35 U.S.C. § 119 in the next communication from the Office.

Applicants submit concurrently herewith an IDS. Applicants request acknowledgement of the consideration of this reference in the examination of this application by return of a signed and dated copy of the IDS with the next Communication from the Office.

The IDS provides partial English translations of three references cited by the Examiner in the examination of the corresponding Japanese application. The Japanese Examiner has cited references that disclose materials for recording images that contain surface treated silica particles (see Claim 1 of the partial translation of reference 1). The prior art particles are treated with a silane coupling agent that may induce hydrophobic properties to the prior art particles. Applicants submit that the prior art Japanese patents do not disclose

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surface treated particle where the particle is any one of a precipitated silica, a pyrogenic silica, a silicate or a synthetic pigment.

Applicants further submit that the recording materials of the prior art references cited in the Japanese examination do not anticipate or render obvious the presently claimed invention at least on part because the silicas disclosed in the prior art references are not the precipitated silica, a pyrogenic silica, a silicate or a synthetic pigment of present Claim 1. For example, Example 1 of the partial translation of reference 1 discloses Syloid 74 on page 2, line 11. This material is a silica gel as evidenced by the product data sheet attached herewith describing the Syloid product line.

Applicants submit that the prior art silicas are silica gels which are significantly different from precipitated silica, pyrogenic silica, silicates and synthetic pigments. Applicants submit herewith a description of the silicas of Claim 1 and a description of the prior art silicas to demonstrate that the structure and physical properties of the prior art materials would be recognized by one of ordinary skill in the art as significantly different from the silicas recited in present Claim 1.

REQUEST FOR REJOINDER

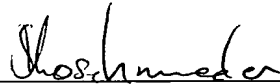
After determining that the subject matter of generic Claim 1 is allowable, Applicants request the Examiner kindly expand her search to include the non-elected species.

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Applicants submit the amendment to the claims places all now pending claims in condition for allowance. Applicants respectfully request the withdrawal of the rejections and the passage of all now-pending claims to Issue.

Respectfully submitted,

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